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TRANSLATIONS ON ENVIRONMENTAL QUALITY

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CONGRESS ON WATER PROTECTION MEETS IN BELGRADE

Belgrade BORBA in Serbo-Croatian 29 Oct 76 p 8

[Text] At the Congress on Water Protection, within the Permanent Conference of Engineers of Southeastern Europe, which is being held for 3 days in Belgrade, it was stressed that member countries, including Greece, Turkey, Cyprus, Bulgaria, Romania, and Yugoslavia, should increase their cooperation, because of the ever more rapid development and industrialization of the modern world and the application of new labor technology.

Yugoslav representatives offered to congress participants three concrete proposals for future cooperation. One is that a joint publication be issued as soon as possible which would contain all the national legal regulations on protecting the water of oceans, lakes, and rivers in all Permanent Conference member countries. The second proposal is that member countries should make up a joint catalog of water filtering equipment which is produced in each member country, in order to obtain an insight into the latest such equipment of individual countries.

It was also suggested that, in order to engage a fair number of highly trained specialists in the complex process of water protection, it would be necessary for the member countries to form a unified center for training such experts. In this way, it was said, it would be easy to find a common language in regard to protection of water which is threatened by waste and other matter and is becoming more polluted every day.

Joint action in water protection within Yugoslavia was also a subject noted at the congress. The fact was brought out, among others, that an association has been formed of about 10 industrial producers in the Rakovica basin near Belgrade who up to now have been the major polluters, through the Topcider River, of the Sava River. The plan is to jointly filter waste water of the Rakovica basin at a location along with the city sewage water. Construction of water purification equipment will begin in all factories along the Topcider River basin next year.

(Editorial Note) The 28 October issue of the Belgrade paper PRIVREDNI PREGLED (page 11) notes that the congress also reported that authorized

organs in Romania had specified the level at which waste water must be filtered and the congress welcomed Romania's signing of the Convention on Protecting the Danube River where by the year 2000 about 100 electric power plants are expected to be operating. It said that a Soviet guest at the congress spoke on mathematical models for biological treatment of waste water. "This idea" of artificially increasing the number of micro-organisms in the mud of rivers, etc. for water purification purposes "aroused great interest because it represented a very cheap and easy" method..., "but the question remains as to whether disturbing the natural balance will not have a negative effect on animal and vegetable matter in water."

CSO: 5000

BRAZIL

# OFFICIAL SUGGESTS CARBON MONOXIDE CONTROL TO COMBAT POLLUTION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 12 Oct 76 p 60

[Text] If by 1982 no measure is adopted to control pollution caused by gasoline vehicles, the center of the city may record carbon monoxide concentrations at an emergency level during most of the year. This warning was made yesterday by Secretary of Works and the Environment Francisco de Barros, upon making public an official appraisal of "Operation Winter." He acknowledged that control of this pollutant was one of the defective points of the campaign.

The center of the city spent 60 percent of the period of "Operation Winter" in a state of alert because of carbon monoxide, despite the publicity campaign, which spent 3 million cruzeiros from state funds to motivate the public not to unnecessarily use gasoline vehicles.

Direct action on vehicles, by the installation of antipollution devices at the assembly, is the proposal which the Secretariat of Works and the Environment will submit in the next few weeks to the federal government for control of carbon monoxide. Secretary Francisco de Barros warned that if no steps are taken, beginning in 1982 the city may spend the entire year in a state of emergency. This will mean a definite risk to the health of the population, necessitating the total paralyzation of vehicle traffic.

Compared to the levels of the past year, the concentrations of particulate material will also increase in areas with excessive traffic. This was a point in which "Operation Winter" also did not achieve results, since control of black smoke emissions by trucks and diesel buses only now will be intensified. The secretary repeated his intention to require the participation of the bus companies in solving the problem and he indicated that "Operation Clean Road," which involved expenses of 900,000 cruzeiros merely on publicity, will be reactivated to promote an effective control of trucks.

In the industrial areas, however, Francisco de Barros guaranteed that pollution recorded last winter was less than in the 2 previous years because of [a reduction in] sulfur dioxide, as well as particulate material. Because of [this reduction in] sulfur dioxide, he reported that there was a

20-percent reduction in greater Sao Paulo and 33 percent specifically in Capuava, where at least two emergency levels would be recorded if the large polluting industries in the area did not use combustible oil with a low sulfur content.

The secretary persistently cited Governor Paulo Egydio as the official responsible for the campaign, and also thanked many others: Minister Shigeaki Ueki and the president of Petrobras, Gen Araken Saldanha, "who made possible the furnishing of BTE (low sulfur content) oil to Sao Paulo," as well as the 86 industries "that voluntarily used the product." However, he refused to reveal the names of 15 other industries that, although included in the initial report, did not use the BTE to reduce pollution in the critical areas.

In the opinion of Francisco de Barros, the use of this oil should not only be expanded to include a large number of industries but also extended to other seasons of the year, although this depends on Petrobras.

In regard to this, a highly reliable company source emphasized yesterday in Rio the existence of good will, but he warned that "it is necessary to be alert to the problem of excessive expenses by the industries." Petrobras recalled that the BTE oil costs 20 percent more than the regular oil.

According to Francisco de Barros, even limiting it to 86 industries, the use of the BTE meant 6,300 tons less sulfur dioxide in the atmosphere during last winter. In addition, he mentioned the "rigorous supervision of Cetesb [Basic Sanitation Technological Center] to justify the reduction of particulate material concentrations in the industrial areas, although he acknowledged that rain also helped. "Operation Winter," as desired by the secretary, became permanent, and it can be put into action as an "emergency plan" at any time.

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BRAZIL

#### INTERIOR MINISTER SEES NEED TO GUARANTEE ENVIRONMENTAL CONTROL

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 14 Oct 76 p 35

[Text] The problem of preserving nature and environmental control is assuming growing importance. The need to reformulate the structure of governmental action in this sector has already been anticipated for the future. In making this statement yesterday in Brasilia, Minister of Interior Rangel Reis observed that the concern about ecology is growing in proportion to economic development, and thus, it will be necessary to guarantee the control of the environment by strengthening the governmental bodies in this sector. He feels that this reformulation will be a task for the next government.

Rangel Reis believes in the natural growth of groups such as SEMA--the Special Secretariat of the Environment--and in the centralization of governmental action, but he rejects the idea of the creation of a new ministry to be responsible for renewable natural resources. He cited as an example, the French experience in this area, which concentrates all the decisions that may affect the quality of life in the hands of the prime minister. Thus, in France, ecology has a decisive power, at least on a par with economic decisions, which guarantees the desired balance between the two sectors.

Moreover, the minister was opposed to the ideas, defended by some, of creating regional ministries, as was suggested for the northeast and Amazon region. In his opinion, such measures would weaken even more the official effort to solve administrative and organizational problems, instead of promoting the accomplishment of programs and the preparation of projects, which should be, in the case of the Amazon region, modeled after the experience of the Radam project. With regard to the policy of occupying the Amazon region, Rangel Reis observed that since it is a large region of varied soil and vegetable cover, he will accept practically any type of economic activity, the ecological risks of which will depend exclusively on technical planning.

To that effect, some government experts believe that an urgent definition of areas of action in the Amazon region is necessary. Taking advantage of sites destined for preservation and the rational exploitation of the forest depends on maintenance of the original quality of the various ecosystems, before the installation of projects considered unfeasible by the experts is pursued. On the other hand, the same specialists recall that the Radam project gave priority to the determination of areas with economic advantage, relegating to the second level inclusively, the headwaters of rivers and regions rich in flora and fauna. But, the majority [of these experts] agree that there is still time to maintain the ecological balance of a rationally exploited region of the Amazon.

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BRAZIL

# POLLUTION PROBLEM PREDICTED AS THREAT TO FUTURE GENERATIONS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Sep 76 p 20

[Text] "The effects of chronic pollution do not generally cause much concern because they are not so conspicuous, but if the situation in Sao Paulo does not change, the problem will be very serious for future generations." This warning was made yesterday in Porto Alegre by Engineer Silvio Esteves, air quality manager of Cetsb [Basic Sanitation Technological Center] and professor of occupational health and air pollution in the Public Health College of the USP [University of Sao Paulo], during a course on air and water pollution promoted by the Brazilian Institute of Oil and the Council for Establishing the Rio Grande do Sul Petrochemical Plant.

To demonstrate the effects of pollution on vegetation and various materials, Professor Esteves cited in his lecture some cases that occurred in Sao Paulo, without identifying the companies involved. "In Cubatao," he said, "there were banana trees of excellent quality that began to produce smaller fruits and to show an abnormal growth rate, when the presence of ethylene in the air of the region increased. In a cosmetics industry in Sao Paulo, all the bottles produced were darkened, and only after several investigations was it discerned that the problem was caused by hydrosulfuric gas coming from the Pinheiros River. The gas reacted with the dye in the bottles, which had a lead base, and caused the darkening."

"In Sao Paulo, the pollution rates will tend to diminish in the next few years," he added, "to the extent that the decisions that are being adopted now show success. But to predict when a good level will be reached is like predicting the day in which one is going to win the lottery."

At the present time, the life expectancy of the Sao Paulo individual is less than a few years ago, "as a result of the deterioration of the environment." Silvio Esteves recalled that infant mortality in Sao Paulo has increased alarmingly, reaching 100 per 1,000 children up to the age of 1. Part of those deaths can also be attributed to air pollution, which has caused an increase of respiratory illnesses in children and in adults over 50."

## BRAZIL

### POLLUTION OF PARAIBA RIVER SERIOUS THREAT

Rio de Janeiro JORNAL DO BRASIL in Portuguese 13 Oct 76 p 10

[Editorial: "Paraiba Threatened"]

[Text] The pollution indices for the waters of the South Paraiba River are a cause of concern in circles involved in safeguarding the environment. In the region it serves, the river plays a preponderant role in the production of wells, apart from insuring a water supply to a considerable portion of the national population. To this pollution is added, and this, too, is very serious, a drop in the water volume caused by the diversion of water and by deafforestation at the headwaters of its sources.

The Paraiba River serves more than 150 municipalities in three states -- Sao Paulo, Rio de Janeiro and Minas Gerais. In all three it serves a social and economic function: it supplies Greater Rio with its population of more than 8 million inhabitants, with drinking water; it generates electrical energy in three plants; it supplies the fields in rural sectors, while it also serves -- which endangers its waters -- to carry away industrial and domestic residues, thrown into it, in the majority of cases, without treatment.

The Paraiba River has been utilized in primitive fashion. It is being used but hardly preserved. Semiabandoned, its waters receive treatment only when they have already been diverted for the noble purpose of supplying settlements. At best, it runs down from Sao Paulo as a recipient of the by-products of civilization, while at the same time it is anonymously losing its liquid force, due to the reduction in its sources caused by the decrease in the rainfall index and the retention capacity of soil damaged by deafforestation.

In an era of ecological concern, it is well to remember that in the region of the sources which give rise to the Paraiba River and its tributaries, deafforestation has long been practiced, such as, for example, in the Bocaiba mountain range, where the forests are becoming sparser despite being declared as a part of the national assets by presidential decree. It is not a matter only of denouncing an ecological crime. More serious,

this warning has to do with the survival of a respectable portion of the population, for example, in the case of Greater Rio, which depends on the waters of the Paraiba for the supply of households.

The river which produces wealth in terms of electrical energy and food-stuffs is being condemned to conversion, in the near future, into a mere channel of filthy water. Faced with this threat, it is not sufficient that studies be pursued or the establishment of bureaucratic machinery recommended. It is necessary to use what is available, the national government with its conservation bodies and the states and municipalities with the authority they have, to prevent the slow and predatory deterioration, to which we are condemning it by neglect, of a river which is indispensable to the center-east region of Brazil.

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## BRAZIL

### DANGERS OF PARAIBA RIVER POLLUTION DESCRIBED

Rio de Janeiro JORNAL DO BRASIL in Portuguese 17 Oct 76 p 22

[Article: "Pollution of Paraiba River Threatens Population in 40 Municipalities"]

[Text] The uncontrolled pollution of the South Paraiba River is almost entirely destroying its aquatic fauna and beginning to pose a threat to the population of 40 river cities, including Greater Rio, which are supplied by its waters. Almost 10 million individuals drink the water of the South Paraiba, and only for those who live in Greater Rio has the water which comes from their faucets had a certain degree of treatment.

Garbage, sewage and industrial and domestic waste, untreated, are the main causes of the contamination of the river, the chemical industry, with its disposal of toxic products, being the main agent responsible for the pollution. Other contributing factors include the lack of any treatment of residue, sugarcane juice skimmings, and the almost total lack of any control.

#### The River Is Dying

Some time ago the South Paraiba had already become an unuseable river, with the direct dumping of the waste of more than 2500 industrial plants and the untreated sewage from more than 40 cities. In view of conservations, this has occurred because the provisions to date have never gone beyond palliative measures or unfulfilled promises.

In the eyes of the experts, however, the most serious pollution problem in connection with the South Paraiba River is the fact that its waters, after treatment, supply Greater Rio. After a study of the Paraiba between Volta Redonda and Tres Rios, the specialists reached the dramatic conclusion that the level of oxidation is so high that the waters are unsuitable even for washing automobiles. They would even damage the paint.

The heaviest criticism has been directed toward the fact that no one paid any attention to the president of the Brazilian Sanitary Engineering

Association, Dr Julio Cerqueira Cesar, when he reported that the Guandu River, which receives its waters from the Paraiba and supplies the entire city of Rio, was heavily polluted by the residues of the chemical industry situated in the Paraiba Valley, both in Sao Paulo and in Rio de Janeiro.

Certain studies show that the great concentration of organic material in the Paraiba River led to the consumption of all the oxygen in the water, thus making life impossible for the fish and other aquatic creatures. The presence of large quantities of toxic substances, such as fluorides, phenols and chromium compounds, in turn, contribute to decreasing life in the waters.

#### Dangerous Dependence

The Paraiba River is of great importance, mainly because it is the only water source available to the state of Rio de Janeiro and a large part of the state of Sao Paulo. It supplies the Paraiba Valley, which has a population density higher than that of India.

But its pollution, according to Prof Fausto Guimaraes, who occupies a chair of hygiene and pharmacy at the Federal University of Rio de Janeiro, has already exceeded that of the Rhine River, which is the recipient of the refuse of three highly industrialized countries: the German Federal Republic, France and Switzerland.

About 10 million persons in three states (Rio, Sao Paulo and Minas Gerais) and 153 municipalities located in their 57,000 kilometers of area, depend on the Paraiba River. But to date, their prefects have made no protest whatsoever concerning the river, because their great concern is to attract ever more industries to their cities.

Whenever the authorities and experts point to the dangers of the pollution of the Paraiba River, state technicians answer that a mathematical model, reproducing all of the river conditions in research centers, would provide the solution. But by the time they find the solution the population of the valley will already have increased 12 percent more and the industries 7 percent, and to complicate the situation, the San Jose dos Campos Refinery will be in operation, attracting petrochemical complexes to the river banks.

With a certain degree of innocence, the FEEMA [State Environmental Engineering Foundation] assures us that the pollution of the Paraiba River is under control and that the quantity of oxygen dissolved in the water still favors the reproduction of animal and vegetable species. This body says that the river has more than 4 milligrams of oxygen per liter (from the Funil Dam to the mouth), a quantity sufficient to support aquatic life.

But the FEEMA seems to be unaware of the results of the bacteriological studies made in various periods. It was demonstrated in 1956 that there was a concentration of 5,000 coliform bacilli per 100 cubic millimeters of

water, a rather high index by North American standards, suitable only for supplying the public after treatment.

And in 1971, that index had already reached 40,000, dropping the quality of the water to the category of "water unsuitable for use," according to the same standards. Currently, the index is 100,000 for some localities and as high as 240,000 in others.

#### Chaotic Growth

The South Paraiba River rises in the Bocaina mountain range, in Sao Paulo, below the junction of the Paraitinga and Paraibuna Rivers. It crosses the states of Sao Paulo and Rio de Janeiro and serves as the boundary between Rio and Minas Gerais. With a length of 1,050 kilometers, it empties into the ocean in the municipality of Sao Joao da Barra, near Campos, after supplying 23 cities in Sao Paulo, 16 in Rio de Janeiro and 1 in Minas Gerais.

The Paraiba supplies water to these 40 cities and further to 80 percent of the population of Rio de Janeiro, through the partial diversion of its waters to the Lajes creek and from there to the Guandu, in Barra do Pirai. It is divided into three sections: the Upper Paraiba, which extends for 250 kilometers to Jacarei; the Middle Paraiba, extending from Jacarei to Sao Fidelis, a distance of 730 kilometers; and the Lower Paraiba, extending 70 kilometers from Sao Fidelis to Sao Joao da Barra.

The deterioration of the river, according to the experts, began with the chaotic growth of the cities in the valley during the coffee cycle. It was in this period that the great burnoffs were begun, threatening even the ecological balance.

Currently, according to estimates, the region has more than 6 million inhabitants, a figure which by the end of the century is likely to increase to 25 million, if the present demographic growth of 12 percent per year is maintained. Therefore, despite the tremendous economic potential of the river, from the ecological and supply points of view the prospects are shameful.

The special secretary for the environment, Paulo Nogueira Neto, himself, has on various occasions warned of the possibility that the same type of pollution will occur in the Paraiba as in the Tiete, a river long since considered to be dead. This is due mainly to the constant use of non-biodegradable detergents, and also the population increase in certain cities and the increasing industrialization of the region.

Today the Paraiba is the receptacle for human refuse and industrial waste of all kinds, from establishments producing insecticides, chemical fertilizers, cement, cellulose, textiles, explosives, foodstuffs, meat products and even from small homebased establishments.

## Undrinkable Water

According to the experts, the river pollution problem begins in the Sao Paulo portion of the valley, where six paper factories alone produce a pollution load equivalent to the sewage waste of a city of 1 million inhabitants. In Jacarei, a small number of industries account for 80 percent of the polluting substances, with paper and beverage factors in the lead. The domestic sewage from the cities of Jambéiro, Santa Branca, Guarerema and Jacarei accounts for 20 percent of the total volume of polluting substances.

From this point on the polluting content increases gradually, with the addition of industrial waste and domestic sewage. Although the color of the Paraíba changes from city to city, its recovery from pollution is almost nonexistent, because in various sectors it receives additional contamination from its main tributaries. The Piabonha River brings in great quantities of detergents from the industries in Petropolis.

The Paraibuna River, another tributary, brings sewage from Juiz de Fora, and the Pomba River brings into the Paraíba large quantities of detergents from the textile factories in Cataguazes, and organic materials from the sugar plants and alcohol and hard liquor distilleries in various other municipalities.

Sanitary experts believe that the damming of the waters of the Paraíba led to the appearance of schistosomiasis, which is developing today at a speedy rate. More than 80 percent of the riparian population suffers from worms which breed in the ill treated water, and epidemics of typhoid fever, hepatitis and other illnesses caused by the river are frequent, especially in the Rio basin.

In 1973, a special commission appointed by the Ministry of the Interior made a study of the valley and made pessimistic predictions as to the ecological problem where the river is concerned. It noted that pollution will within a short time constitute a serious threat to life in the populous centers of the basin.

The most dramatic point in the study was that pertaining to the biochemical and bacterial pollution of the Paraíba River. "In some sectors," the experts said, "the indices are so ridiculous that if we were to compare these waters with the existing norms for quality standardization, they would long since have been excluded from the category of potability. This results in the destruction of aquatic life by pollution, the water becomes too noxious for household supply, and its use for agricultural and other uses is even threatened."

## An End to the Fish

The high pollution index in the South Paraiba River has practically put an end to professional and amateur fishing throughout its length, and has destroyed an important supplementary source of foodstuffs for the riparian population. Today, traditional species of fish such as the Amazon lung fish, snook, piaba, freshwater catfish, dorado, minnows and the mailed catfish are extinct almost all along its course. Where they still survive, the fish, too, are contaminated and are not readily marketed.

The only point along the Paraiba where fishing is still productive is the municipality of Sao Fidelis, the natural breeding ground of the pitu shrimp (called "lagosta" by the local inhabitants). To the extent that the Paraiba proceeds toward its mouth, to empty into the Atlantic, the potential for life decreases steadily.

In Campos, there have been repeated warnings that in the area of the water treatment stations, the pollution of the Paraiba River reaches 45,000 colibacilli per cubic millimeter, although the upper infection limit for water destined for human consumption is 20,000. And also because all of the sewage in the region is dumped in the river as is, without any type of treatment, there has been an increase in the incidence of gastrointestinal diseases and dehydration.

The sugar plants further aggravate the situation by dumping highly toxic wine leavings into the river in large quantities. Estimates indicate that the plants dump 3.6 million liters of such waste during the sugarcane harvest, causing pollution equivalent to that which would be produced by a city of 4 million inhabitants.

Dead animals and vultures can be seen along the various sections of the river, where the water has an evil smell, but foam is the clearest evidence of the pollution. The various reports by the experts reiterate:

"From Resende on, the pollution of the waters of the Paraiba River increases to an intolerable level. At Barra do Pirai, Volta Redonda and Barra Mansa the river is the recipient of the untreated sewage of a large portion of the population. Apart from sanitary waste, unuseable materials and untreated industrial residues contaminate the water which gives off an evil odor which announces the pollution even from a distance. There is no control or policing. The river is responsible for a large number of diseases."

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CSO: 3001

STATUTE ON NOISE POLLUTION TERMED INEFFECTIVE

Jerusalem THE JERUSALEM POST in English 24 Sep 76 p 20

[Article by Sarah Honig: "Noise"]

[Text] The statute popularly known as the Kanowitz Law deals with the nuisance of noise. But still, 15 years after the bill was enacted, says Sarah Honig, virtually nothing has been done to eliminate what is not merely an irritant to people's nerves but a serious hazard to health.

In Holon, three- and four-year-olds have acquired a curious expertise: they excel at identifying airliner emblems. This isn't just kid stuff, playing with printed insignia on toy planes. Hands pressed tightly over ears, they spot the emblems on the tails of low-flying jets shrieking over their apartment blocks.

What the youngsters don't know is that they shouldn't be experts at all. The grown-ups, it seems, don't appreciate the fun of these frequent overflights and have, for many years, been trying to have the jets banned from the skies over this city of 130,000 inhabitants. Grown-ups get very annoyed when ordinary conversation becomes impossible as a jet passes overhead, when the engine roar wakes them in the middle of the night, and when they have to pacify babies frightened by the thundering noise.

In the autumn of 1975, new take-off regulations went into effect at Ben-Gurion Airport, forbidding departing jets from overflying the densely-populated centre of Holon. Pilots were instructed to take a more southerly route, closer to the sand dunes at the Holon-Rishon Lezion border line. The planes were also to make a quicker ascent and fly at higher altitudes.

Even if the kids had known that they might be deprived of a favourite pastime, they needn't have worried. Like many other regulations or laws meant to improve the quality of life in Israel, these, too, remained only on paper.

In this case, implementation of the regulations was not a complicated matter. There are monitoring devices that could be placed in town to detect violations by pilots of regulations on flight course, altitude and engine noise. Such instruments have been promised by the Transport Ministry since 1974. Despite periodical municipal outcries, they have yet to be installed. Mayor Pinhas Eylon says he is encouraged by new ministerial undertakings, which give him hope that negotiations now underway will soon remedy the situation. But meanwhile, the planes continue to zoom past, scared babies bawl, adults grind their teeth and try to lip-read the TV announcer's words, and the children continue to vie with each other at identifying aircraft.

The unimplemented take-off regulations are only a year old. But there are other far older "successes" in the battle against noise and pollution which have proved equally ineffective.

Every time you are unlucky enough to get behind an Egged bus and fill your lungs with the rich, black fumes emitted from its exhaust pipe, you are presented with an example of just how effective are some of the laws enacted by Israel's legislature. The 1961 Kanowitz Law was to have spared us from inhaling such insalubrious mixtures, but the bus cooperatives managed to come out on top in the trial of strength with the Knesset.

At the offices of Malraz, the Council for the Prevention of Noise and Pollution, Yehudit Ayalon led me to a tall pile of files, which, she says, "don't contain documentation of battles against major environmental hazards such as power stations or garbage disposal plants. They deal with very common environmental problems, the likes of which could affect any of us."

Most of the cases were never brought to a successful conclusion--not even of the sort scored in the Holon anti-jet noise campaign.

Yehudit, who bears most of the burden of dealing with and processing complaints, feels that local authorities "often plan without regard to the environment. A great deal of trouble could be spared with just a little foresight. The courts frown on our complaints. It's as if we were taking up their time with petty matters, when there is such a backlog of 'serious' cases. Enforcement of pollution and noise control laws seems to be lowest on the police list of priorities. We are always told that there isn't enough manpower to attend to our complaints."

There have been so many complaints about motorcycle gangs that the police have finally told Malraz that if it will indicate where the disturbances are chiefly concentrated, action will be taken. But, ask Malraz personnel, what are "concentrations" of noise? How many gang members need disturb the peace to warrant police action? Isn't a solitary cyclist bad enough?

Truckers and bus drivers seem likewise to be immune from police action. At present, drivers make full use of their liberty to park their giant

diesel-powered vehicles anywhere. Residential streets are often turned into truck and bus parking-lots. Since the drivers usually have to be on the road early, they switch on their engines at dawn under their neighbours' windows, jolting them out of their sleep and filling their bedrooms with exhaust fumes.

Most municipalities have yet to allocate the special parking areas for large commercial vehicles which are essential if the purpose of the Kanowitz Law--the abatement of nuisances--is to be fulfilled.

The majority blame the Lands Authority for not providing the land. Tel Aviv, Haifa and Hod Hasharon are planning such parking facilities. Ramat Gan was the first to have actually limited overnight parking of trucks to industrial zones, but its by-law has a loophole: the driver may not leave his vehicle at the curb of a residential street, but he may park it in his yard. Holon chose to locate a truck parking-lot so close to a housing development that the residents demonstrated and the plan was scrapped. But no alternative site in the industrial zone or the city's extensive sand dunes was chosen.

When a Ramat Aviv resident complained of a bus parked across from her house, Egged proved that it is a law unto itself. "The driver has our cooperative's permission to park there," said an official letter of reply.

Traffic itself is a major source of noise, especially at traffic-light intersections. In many areas, inadequate planning results in traffic jams and accompanying noise.

Hadera's Herzl street, just outside the windows of the Ahad Ha'am Elementary School, is so noisy that Health Ministry tests proved that undisturbed study is impossible. The city remained unimpressed and argued that it can neither block the thoroughfare nor move the school. The Transport Ministry does not altogether believe the Health Ministry, and insists that there is no excessive noise and that anyway, the traffic flow is not great.

But the automobile is not the source of all noise pollution. Yehudit's files include complaints about a new sports centre in a Ramat Hasharon residential street; about taxi ranks where drivers talk loudly throughout the night and leave their car radios on for the whole neighbourhood to enjoy; and even about dogs.

From Malraz' files, it is plain that canines are not best friends to all men, especially to those whose neighbours allow their pets to keep whole neighbourhoods awake or let their watchdogs loose to terrorize entire streets, making them impassable to pedestrians whose scent is unfamiliar to zealous snouts.

Even the exuberant sound of two dozen sabra tots can fail to instil joy in some hearts, especially if they come from a kindergarten located in an apartment house. At present, many a room in a private flat serves as an unofficial but profitable nursery school.

Regulations made under the Kanowitz Law prohibit garbage collection before 6.00 a.m. but this has not prevented Givatayim sanitation men from noisily emptying cans and tossing them on the sidewalks at 5.00 a.m. The huge wheeled garbage containers, made mandatory by many cities in new buildings, are even greater noise makers, though they are not hoisted by hand. Their advantage, however, is that they provide an excellent habitat for insects, as they can never be thoroughly cleaned out.

Few Israelis are spared the ill-effects of excessive noise. Results of Malraz surveys are enough to frighten the most complacent and prove that noise pollution is not the problem of a few unfortunates and that it is not merely a nuisance but a serious health hazard. According to Malraz findings, the physical and psychological well-being of pedestrians is endangered by noise levels on such streets as Jerusalem's Jaffa Road; Ben Yehuda, Allenby and Dizengoff in Tel Aviv; Herzl and Ha'atzmaut in Haifa; and Ramat Gan's Rehov Jabotinsky.

Malraz experts say that Israelis begin suffering hearing loss while they are still at school. When members of the discotheque generation reach their 50th birthday, there will be two to three times as many cases of deafness among them as among today's middle-aged population. Considerable hearing problems are also in store for people who travel constantly by bus and for drivers of every type of vehicle.

Noise, Malraz points out, affects more than our ears--it influences our whole being. Excessive noise at work and on the road, in fact, is cited as one cause of Israel's alarming accident rate, because it appreciably lowers mental alertness. Constant noise slows down blood circulation, affecting mainly the limbs and the brain. Sudden noises speed up the heartbeat. Both reactions irritate the nervous system, do mischief to our digestive processes, and even bring about hormonal and blood-chemistry changes.

Noise at night disrupts the alternating pattern of deep sleep and dream periods, even if it does not actually rouse us. Car horns and overflying jet carriers can cause us to get up tired and edgy in the morning, even after a seemingly uninterrupted night's sleep.

Even when we are not consciously irritated, excessive noise bothers us. We cannot turn off our minds, and the brain is busy analyzing even meaningless noise signals that come its way. When subjected to too much noise too often, this results in mental fatigue, tension, heightened blood pressure and all the ills that come in its wake.

"Most of the harmful noise pollution is man-made and easily avoidable," says Yehudit Ayalon. "A bit more consideration and a little more quiet would go a long way to making us all easier to get along with."

USSR

## ENVIRONMENTAL PROTECTION MEASURES IN ANGARSK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Oct 76 p 2

[Article by I. Fedoseyev, secretary of the Angarsk CPSU City Committee, Irkutskaya Oblast: "The Overall Concern for the Environment Has the Party's Attention"]

[Text] Well-thought out, geometrically arranged streets, well-built homes, an abundance of stores, theaters and palaces of culture, pine and birch groves on large inhabited tracts--this is the face of modern Angarsk, a city of Siberian petrochemists and cement workers. And we, the people of Angarsk, are proud not only of our successes from our labor but of our achievements in environmental protection.

Old-timers still remember when it was still possible to determine which trolley had arrived from the petrochemical combine without having to glance at its number. Those times have passed. We are modernizing what is now operational, building new purification facilities and dust and gas trapping installations, improving technology, and we are educating people in the ways of conserving nature. All this is yielding noticeable results. For the last five years gaseous contamination of the atmosphere and pollution of bodies of water have decreased by one and a half times. And we are striving for absolute purity, for the natural condition of the environment. But supporting ecological equilibrium when the biosphere of the city is situated opposite a complex of petroleum refineries and chemical plants is far from simple. We are not exaggerating and at the same time we are not closing our eyes to reality.

The city committee [gorkom] of the party, guided by the decree of the CC CPSU and the USSR Council of Ministers "On Intensification of Nature Conservation and Improved Utilization of Natural Resources," keeps the solving of this vitally important problem under continual control. The orientation on practical interests of the moment and the tendency not to think of the possible consequences from industrial activity are characteristic of the inadequacies of many economic managers. What was formerly considered unessential now merits great attention and provokes the sharp censure of public opinion. I

remember the disapproval of the deputies of the city council caused by a remark made by the chief engineer of the petrochemical combine, B. I. Matveyev, when at a scheduled session he observed that contamination of the city's atmosphere by the chemical industry was unavoidable and something we would always be aware of. Because of this remark they perceived the unwillingness of the manager to occupy himself with this "strange" matter.

In its own work the city committee strives to be guided by society. For several years now the commission on conservation of the external environment has been active here on public principles. It includes representatives of the scientific research planning institutes and leaders of the city's enterprises. Work on the commission is looked upon as a responsible party assignment. Its task includes the control and coordination of efforts tied to environmental conservation. Each commission member is a qualified specialist in his own field. The commission members conduct investigations of the enterprises, develop corresponding recommendations, analyze accident situations unmasking their reasons. The commission carries out assignments of the gorkom, constantly keeping it informed of the commission's activities and enjoys great prestige with the city dwellers. But it has earned this by a genuine principled party regard for this matter. In the event of a necessity the commission members boldly and keenly place their problems before managers of all ranks never fearing damaging relations.

One such instance is indicative. In September of last year at the nitrogen fertilizer plant construction was concluded on the next in a line of units for the production of weak nitric acid. Installation of a device to purify spent gases of nitrogenous oxides was delayed. The plant director, A. F. Babikov, was ready to activate the unit without the purification device. His position, he argued, was the necessity to fulfill socialist obligations calling for the output of nitrogen fertilizer in excess of the plan. The commission on environmental protection declared itself to be categorically opposed. The party gorkom agreed with this opinion and proposed that the plant together with the builders speed up installation. Activation of the unit, it is true, was delayed for a period but it became operational simultaneously with the purification device. Incidentally, the collective was able to fulfill its socialist obligations without causing damage to the air basin.

We are devoting much attention to progressive methods. Practice indicates that publicizing these methods often proves to be more effective than strong measures. We have the Angarsk Cement and Mining Combine lead by the honored RSFSR builder, B. I. Kuznetsov. Monthly at this combine gather many economic and party managers, dozens of delegations from the most diversified enterprises and all of them receive an object lesson in the care of nature. The beauty of its avenues, fountains and squares in the area of the combine successfully rivals that of the city's parks. For the last five years here dust exhaust into the atmosphere has been curtailed by 2.4 times. This is an excellent indicator for cement production.

I cannot speak with accuracy about the influence that the cement workers' experience has had at enterprises in other cities but in Angarsk it is apparent. Neighboring the combine are building materials plants and a ceramics plant and they have been transformed from dust polluters to highly cultured enterprises.

The most valuable element of the cement workers' experience is that not just a single director is working on environmental protection, but, very energetically, the entire collective. The communists set the fashion. The gorkom points to the local party organizations for study and dissemination of these progressive methods.

Together with this are the problems emerging beyond the limits of influence of the city party organization. Here we are speaking about control over utilization of funds allocated for the conservation of nature. Now they go into a common allocations fund intended for the development of industry. But the ministries must be more explicit in their planning and use separate line items. In this case it would be simple to control allocated funds and they would be used for an intended purpose. In the meantime there are instances when instead of a gas purification device, something else is being built. The valid reason is always right at hand. It is, as they say, required in the interests of production.

And there is one more feature that is just characteristic of Angarsk. Our city's industry develops according to plans from 20 institutes. Each of them specializes in a narrow field of their branch and often is unable or does not care to consider all of the diversities of the city's industrial infrastructure. The lack of information held by the planners dearly costs the government and threatens nature with serious damage. Let us turn to a concrete fact. A flame producing entity of a new ethylene and propylene complex of the synthetic petrochemical products association Angarsknefteorgsintez, built according to a plan of the All-Union Scientific Research and Planning Institute for Petroleum [VNIPINeft'], turned out to be incompatible with the chemical reagents plant planned by the Khar'kov institute Giprokhimreaktiv. The products of combustion formed in the flames fell into the reagent plant's air intakes and sharply reduced the quality of the reagents. Each institute individually planned its own project not thinking of the other neighboring enterprises and the possibility of influencing each other.

Such instances are not isolated. Therefore it would be proper to entrust the functions of a lead city planning organization on the problems of industrial influence on the environment to the Angarsk branch of the institute VNIPINedt'. It is better prepared to assume the role of lead organization, more so than any of the city's other institutes, since it is a group fully occupied with ecology on a scale of the association Angarsknefteorgsintez.

A purposeful distribution of funds for the building of purification structures and dust and gas trapping devices and identifying the Angarsk branch

of VNIPINeft' as the lead organization are proposals dictated by reality. More than once the city's communists at meetings and at party and economic aktivs have spoken of them. Their realization will be a new important contribution in the matter of environmental protection. It will show the concern for the health of the Soviet people.

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CSO: 5000

## GREECE

### PIRAEUS POLLUTION SEEN DANGEROUS

Athens TA NEA in Greek 4 Oct 76 p 12

[Article by Khara Kiosse]

[Text] There is one municipality which is taking active steps to protect its residents from pollution. The municipal authorities of Piraeus, together with the public prosecutor and the general chief of police, summoned a conference last Saturday morning for the purpose of taking immediate measures for the protection of the environment of Piraeus. Following the conference, they paid an on-the-spot visit to some of the chief sources of pollution--sources which are considered highly dangerous to the health and even the life of the residents of Piraeus.

A committee--made up of deputy mayor Zervos, Piraeus first instance court public prosecutor Dion. Paizis, general police chief Georgios Angelopoulos, president of the Piraeus medical association Manolis Khrystoulakis, the secretary general of the municipality, Nikolaos Katsikaros, and the scientific advisor to the mayor on environmental matters, Panagiotis Khristodoulakis--paid a visit to the fertilizer company, where:

Some six anhydrous ammonia storage receptacles have been installed. And there are fears that at least two of these storage vessels contain some other toxic gas which is even more dangerous.

#### Failures and Omissions

It was ascertained from the on-the-spot visit of the Piraeus authorities, which was done without warning, that there are no safety valves on these high-pressure vessels, and that there are no identification plates stating what is being stored and in what amounts. It was likewise found that--whereas storage receptacles for toxic gases ought to be separated from one another by at least 10-20 meters and have mounds of earth between them so that in case one of them explodes the explosion will not be transmitted to the others--these receptacles are placed in a group of four on one side and two on the other, situated almost in contact with one another. And the operating permit for them, on which their contents

would be stated, was not given to the public prosecutor when he asked for it, because it was Saturday and the offices of the firm were closed.

Apart from these storage receptacles, it was also ascertained that there are large quantities of iron pyrites which have been left exposed in the area around the plant, where more than 1,500 workers are employed. These iron pyrites, when they are stirred up into the atmosphere by the wind, give rise to the danger of pneumoconiosis, which is one of the most serious of illnesses of the respiratory system. The mayor of Piraeus has collected data according to which there are very many cases of pneumoconiosis in Drapetsona, and there are persons there who are staying alive only through the use of oxygen bottles.

But pollution and dangers to the health of the residents of Piraeus are not restricted to this fertilizer company alone, which as we know dumps its wastes into the sea, which has itself become lifeless within a large radius around the plant.

#### Severe Pollution

The Piraeus authorities later visited a plant which makes plaster of Paris, and where so much gypsum dust is emitted all around it that one has the feeling that he is in a snow-covered village in the Pindos Mountains.

Piraeus is a severely polluted city, so much so that life here is becoming truly difficult, almost inhuman!

For months now, a pollution-measuring station run by the climatological laboratory of the University of Athens has been located in the municipal library. This station, which is being operated under the direction of P. Khristodoulakis, scientific advisor to the mayor, records the degree of pollution by means of a self-recording apparatus.

Thus, the observations which have been made up to now show that Piraeus has 35 percent more soot than that recorded by the station of the same university laboratory which is located in Athens on the corner of Akadimias and Ippokratous streets. And the concentrations of sulfur dioxide in Piraeus have an average monthly value of 382 micrograms.

As is known, the international standard set by the World Health Organization indicates a monthly value of approximately 60 micrograms. But there are also other data from this automatic recorder which sound the danger alarm for Piraeus. Within the month of January 1976, there were 10 days during which the greatest concentration of sulfur dioxide was between 300 and 593 micrograms.

And again, according to the international specifications of the WHO, only one day in a year is allowed to have a maximum concentration of sulfur dioxide up to but not exceeding 365 micrograms. But in Piraeus, within

only one month, we have had 10 days with such large concentrations. And as we know, the average value does not mean anything. It is the large concentrations which are of concern and which are paid attention to by the scientists. It is then that cases of respiratory illnesses, and even deaths among those with heart diseases, make their appearance.

In talking about deaths from heart diseases and respiratory illnesses, it would be interesting if the Ministry of Social Services were to study statistical data on the death rate from these illnesses in the areas of Piraeus, Souda, Drapetsona, and Keratsinion. Because there are unofficial reports that in the last 5 years the death rate from these causes has increased by 35 percent. But it is necessary to have official confirmation.

Through the mobilized effort the day before yesterday by the Piraeus authorities, a serious effort at environmental quality control is being made for the first time in our country. This is a job which presents tremendous difficulties, because pollution in Piraeus is not confined only to the industries--even if it is there where the most intense pollution is found. All of the ports in the Piraeus area are severely polluted, amounting to open sewers. At Passalimani, the pump house of the Drainage Organization is not operating, and the sewers are discharging directly into the sea near it. The same thing is happening also with the toxic wastes of the Tzaneion Hospital. At Tourkolimanon, the two sewers are not functioning, and all of the hotels along the sea shore have their own drains which are discharging directly into the sea! And the harm being done does not stop there.

12114  
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## GREECE

### BRIEFS

TANKER-CLEANING EQUIPMENT--Facilities for the containment of oil sludge are going to be acquired soon by the country's large ports, in accordance with the obligations which Greece has recently assumed as dictated by the international convention of 1973 "concerning the avoidance of pollution of the sea." The sludge from oil or from petroleum product mixtures will be removed from the ships at these facilities, and thus the dumping of this sludge into the sea will be avoided. The appropriate service of the Ministry of Merchant Marine has already sent a communication to the Piraeus Port Authority and to the Salonica Port Authority, as well as to the Elefsis Port Fund, in which the rapid installation of sludge containment systems is proposed. [Text] [Athens TA NEA in Greek 4 Oct 76 p 12] 12114

CSO: 5000

SWEDEN

# SULFITE FACTORY INCREASES POLLUTION OF INDALS RIVER

Stockholm DAGENS NYHETER in Swedish 27 Oct 76 p 18

[Article by Ake Lidzell]

[Text] Ostersund, Tuesday--The waters of the Indals River are heavily polluted with discharge from the commune of Ostersund and the Forest Owners' sulfite plant in Hissmofors. That is what was learned from an alarming water analysis carried out along the 20-kilometer stretch between the Kattstrupe Rapids and the Granbo Rapids outside Ostersund, where the Indals River flows out of Stor Lake. During the past 2 years the area's fish have also been dying on a large scale.

DAGENS NYHETER was told by biologist Staffan Holmgren at the County Administration Board in Ostersund: "The commune of Ostersund and the Hissmofors sulfite plant (the Norrland Forest Owners' Cellulose Corporation) are the worst polluters of the environment in Jamtland County."

He has seen the results of a careful water analysis just completed by a consulting firm. The water level between the Kattstrupe Rapids and the Granbo Rapids was lowered substantially, making it possible to carry out a thorough examination of the river's condition.

"The pollution is worse than we thought. The bank is covered with a slimy mass of spongy sewage that is about 2 centimeters thick. The spongy sewage shows that the water is heavily polluted."

Below the Granbo Rapids, however, the water is considerably cleaner.

Staffan Holmgren says, "The rapids act as a natural purifying system and oxygenate the water. And it is lucky that they do. Never before has such heavily polluted water been found in a river as big as the Indals. The samples are now going to be analyzed by biologists at Uppsala University."



The river is being contaminated at the Stor Lake outlet west of Östersund.

The fouling of the water may also affect the decision concerning an application to harness the Granbo Rapids. If those rapids were to disappear, the polluted water would continue farther down the river.

The water analysis was ordered and paid for by the Östersund Electric Corporation, which wants to build the planned powerplant at the Granbo Rapids and must attach a water analysis to its application.

Now a larger study is required, and the Östersund Electric Corporation is asking the commune of Östersund, the Hissmofors sulfite plant, and the commune of Krokoms to help pay for it. One of the objectives is to find out how much each of those entities discharges into the river.

At the height of summer in 1974 and again this past fall, the area's fish population was devastated. For one thing, the salmon and whitefish were being attacked by the lethal skin disease known as UDN [expansion unknown], which had been noted earlier in the water around Sundsvall and Lulea and off the coast of Scotland. Now the hope is that this more thorough water analysis will show whether the fouling of the water contributed to the dramatic number of deaths among the fish.

11798

CSO: 5000

SWEDEN

#### KIRUNA-NARVIK ROAD CONSTRUCTION IMPACT TO BE RESEARCHED

Lulea NORRSKENSFLAMMAN in Swedish 18 Oct 76 p 2

[Text] Stockholm--The guiding principles have now been worked out for a bio-scientific and geoscientific research project aimed at documenting the various effects that the Kiruna-Narvik road will have on the natural environment in the Torne Marsh area. The program is tied to the road construction project as an experiment for determining the impact in an area where an entirely new environmental factor is introduced.

Continuous researching of the effects of the road will make it possible to build up the basic data needed to predict the impact on nature both within the area being studied here and in other areas where similar encroachments are planned. The results and experiences can then be used universally in planning for natural resources, a field in which there is currently a lack of sufficient basic data for assessing the consequences of various types of encroachment into sensitive natural environments.

#### Compensation

It was Assistant Prof Mats Sonesson of the Academy of Sciences Natural Science Station in Abisko who, at the request of the National Road Administration, worked up a proposed program for these conservation measures. The matter has assumed topical interest due to the building of the international road between Kiruna and Narvik. The immediate reason for the investigation--known as the "Torne Marsh Road Ecological Study"--is that the County Administration Board of Norbotten County decided, on the basis of paragraph 42 of the Nature Conservation Act, that encroachment on the interests of nature conservation must be offset by compensating measures. In this case, the compensation will consist primarily of researching the area from the standpoint of nature conservation before, during, and after the road construction work.

#### Natural Resource

In the main, National Highway 98--from Kiruna to the border--will run just north of the railway ore line along the southern shore of the Torne Marsh,

in some places running right up to and on the lake. The result is that the road project will have both direct and indirect effects on an area that is of great value from the standpoint of both national and international environmental protection. For more than 70 years the Torne Marsh area has constituted a natural resource of great value as far as scientific research is concerned. There are a number of reasons that account for this circumstance. The combination of a diversified world of nature within a limited geographical area, the area's unspoiled character, and its accessibility has been of great importance, as has the fact that there is access to a field research station--the Academy of Sciences Abisko Station. Because of the administrative restrictions in effect and because the railway provides the only access to the region by land, it has been possible so far to maintain a satisfactory balance, from the viewpoint of science, between the partially conflicting social and scientific interests in nature conservation within the area. The extent and concentration of outdoor activities has thus been limited, and in general their effects have been restricted to the immediate vicinity of the railway, the tourist resorts, and the more important tourist routes.

#### Unspoiled Nature

Research concerned with most bioscientific and geoscientific fields of interest has been carried on in the Torne Marsh area, and the results of those studies could be directly related to nature in its unspoiled condition. To a large extent, it was precisely that possibility of using the region as a reference area that motivated the studies. Scientific interest in the area has therefore grown in recent years as a consequence of the greater impact being noted in other areas, along with a greater understanding of the need for such environmental control research. Unspoiled reference areas are an essential prerequisite for research of this kind.

The importance of the Torne Marsh area in this respect is also reflected in the many studies and proposals for setting aside national reserves in that area. These have been appearing since the turn of the century at the initiative of individuals and through the commune, the county authorities, and the national authorities. Among those presented in recent years we can note the following:

1. The proposed biosphere reserve for UNESCO's MAB (Man and the Biosphere) program.
2. The proposed type locality for UNESCO's international geochronological program.
3. The proposed type locality for the WMO [World Meteorological Organization].

#### Environmental Control

Here we can also recall Sweden's proposal at the UN conference held in Stockholm in 1972 for a system of global environmental control. The Torne Marsh area was suggested as a suitable Swedish area.

As a result of earlier studies, the Abisko National Park was established in 1909, the Vadvetjakko National Park was set aside in 1920, and, beginning in 1974, the Torne Marsh was designated a protected area under paragraph 8 of the Environment Protection Act.

It is noted in the present report that the social interests in nature conservation will generally be favored by the road up to the limit represented by the area's capacity for absorbing the activities that will be involved. At the same time, however, it is noted that a portion of the tourism that occurs in the area today is also motivated by the absence of motor roads and their secondary effects, which are regarded as unfavorable.

#### Adverse Effects

On the other hand, the scientific interests in nature conservation that have existed until now will be adversely affected, both directly and indirectly. The extensive research activity which has been carried on in the area until now will gradually decrease in importance and scope as human influence in the area increases.

Some of the effects are directly linked to encroachment by road construction itself, others will appear as soon as traffic begins, and still others will only become important after one or more decades have passed. The reason for this lengthy time scale is a natural one. Road construction cuts through valuable natural objects which are immediately destroyed or altered. Traffic and the growing influx of humans affect the ground and the environment in the vicinity of the road, and the road itself and the activities it gives rise to affect the natural processes of the landscape as regards both the inanimate (abiotic) and the animate (biotic) environments. The impact on those processes--for example, growth, the decomposition process, erosion, material handling, and so on--can sometimes be drastic, but most often the effect is slow and only gradually results in an obvious change in the natural environment.

#### Changes

The effects have a wide extension in space. Some of them are limited to the road itself and its immediate vicinity (for example, direct damage to the ground), others show up in those areas affected chiefly by the greater influx of tourists (for example, a greater wearing down of the soil), while a third type brings about changes in the quality of air, water, and sediment. The impact of these effects is felt over the entire area reached by the movement of air, water, and sediment from the locality disturbed (for example, chemical components in the water). The Torne Marsh is the recipient for the entire drainage area, and this means that for a long time to come it will be of fundamental importance in assessing the cumulative impact.

The changes in what is called an environmental variable (for example, the local distribution of temperature, ground water conditions, water quality,

and sedimentation conditions) give rise to secondary changes that affect the flora, fauna, and so on. This is true of both the terrestrial (land) and the limnal (lake) environments. Therefore it is not enough to deal with each individual variable as an isolated problem. The connection between the different variables and the causal relation must be investigated. The environmental effects must be assessed from the standpoint of the importance they will have for the natural environment as a whole.

The report therefore points out that nature conservation measures in the area must be planned so as to satisfy three conditions:

1. In time: the assessment must cover the entire range of time scales, from the construction phase through the long-term prospects.
2. In space: the studies must be concerned with damage caused as a direct result of the road and also with the nearby and distant effects.
3. Overall view: each instance of environmental damage must be assessed with regard to its importance for the natural environment as a whole.

#### Coherent Program

If those three conditions are to be satisfied, studies must be started as quickly as possible so that the conditions existing before the encroachment begins can be researched. The studies will then continue during the construction phase and also after construction is completed, so that the long-term effects can be assessed. It is of great importance that the program be planned as a coherent research project and not be viewed as an unrelated series of separate measures aimed at passively recording the various effects of the road.

The report then summarizes the various studies that will become necessary in connection with air, water, and land and the organisms living in those elements (vegetation and fauna).

#### Centralization

It is taken for granted that the activity will be centralized at the Abisko Natural Science Station, and it is therefore proposed that the Academy of Sciences, which owns the station, also be in charge of the project. It is suggested that a special task force be appointed as soon as possible to take charge of the general management and oversight of activity. The task force is to work up the program in greater detail and decide on the procedures for implementing the project. The task force will include representatives of the Academy of Sciences, the National Road Administration, the Abisko Natural Science Station, the various branches of science concerned with the activity, and the general interests of nature conservation and society.

The annual operating costs are calculated at 3 million kronor during the first 4 years and at about 2.5 million kronor thereafter. To this is added

a one-time expenditure of 2 million kronor for the necessary apparatus. The cost of fitting out the Abisko station with the necessary living quarters, working areas, and so on is estimated at 8 million kronor.

The Road Administration will shortly begin considering the proposal in consultation with the County Administration Board and the National Environment Protection Board.

11798

CSO: 5000

SWEDEN

# IMPACT OF RADIOACTIVE WASTE ON BEDROCK STABILITY EXAMINED

Stockholm SVENSKA DAGBLADET in Swedish 12 Oct 76 p 3

[Article by Lars Y. Nilsson of the cultural-technical department at the Stockholm Advanced Technical School: "Sun and Moon Affect Underground Water"]

[Text] The AKA [expansion unknown] report is wrong concerning the stability of the Swedish bedrock. And it does not at all touch on the "ebb and flood movements" in the earth's crust which are caused by variations in the force of gravity.

The development of the so-called civilization has meant and means that various kinds of waste are produced in great quantities. Dealing with this waste is a great problem. The dominant solution to this problem has been and is to try to hide the waste as cleverly as possible. However, history shows that this has been a bad method of solution and that the "problem" sooner or later has surfaced again and then as a much more serious environmental problem. For example:

- 1) Waste water has been led to water courses, lakes or down into the ground, and now one is faced with difficult restoration problems;
- 2) Oil has been dumped into the sea and has destroyed large areas of water;
- 3) Refuse dumps have been "hidden in the woods" and have resulted in destruction of both surface water and subterranean water.

This list can become long. The latest addition to the waste category is radioactive waste (primarily from the nuclear power plants). This waste constitutes an environmental hazard of such a character that it can scarcely be compared to any of the ones previously known. Dealing with this waste follows the old pattern, according to the proposal of the AKA report. This time, it is cleverer than ever before. The radioactive waste is to be concealed in the Swedish bedrock with the motivation:

"The study shows that Sweden with its stable and, for millions of years, calm rock foundation possesses favorable geological conditions for such storage." (From SOU [expansion unknown] 1976:30.)

## Cracks and Cross Zones

Besides suggesting a method which implies a risk for future problems, the motivation is highly debatable. Swedish bedrock is neither calm nor stable.

The bedrock is crossed by fissures and cross zones and these usually carry subterranean water. The foundation can be more or less cracked and the fractures go down to various depths, but it is never completely free of fissures.

It could be mentioned in this connection that the supply of water in our country to a considerable extent is based on subterranean water. About 10,000 wells are drilled each year. The wells generally do not go deeper than 150 meters depending on present drilling techniques and the doubt concerning the quality of water at greater depths. Knowledge is poor of the existence of cracks and subterranean water at greater depths (200 meters or more) that could be considered. The questions of subterranean water are dealt with in the study but several questions remain unanswered.

The study further considers the danger of local earthquakes, volcanic eruptions, meteor impacts, and so on. This danger is characterized as vanishingly small.

## Ebb and Flood in the Earth's Crust

What the study does not touch on, however, is the movements which constantly occur in the "firm" crust of the earth analogous with the ebb and flood in the oceans. The globe is not a rigid or firm body but is instead elastic, and the entire crust moves regularly as a result of variations in the force of gravity.

This movement is particularly easily detected precisely in the Swedish bedrock. Because the foundation moves up and down as a result of regular variations in the force of gravity, the pressure on the subterranean water which exists in the system of cracks in the rock also changes. The fissures regularly expand and contract.

When the pressure eases, meaning when the gravitational acceleration  $g$  decreases, this results in a lowering of the water level. When  $g$  increases, the pressure goes up and the water table with it. The variations in  $g$  are related primarily to the movements of the moon and second to those of the sun. The variations in  $g$  are very small, only one unit in the sixth decimal place or so, but the 24-hour amplitude in the level of underground water can measure up to 10 centimeters.

Each point on the earth's surface is affected by two forces, gravitation and the centripetal force. These forces form a resultant force aimed at the center of the earth. Its size determines the gravitation on the point and its direction defines the plumbline. These two magnitudes are not constants for a certain point because primarily the moon and the sun affect the point by attraction, which varies according to the movements of the planets.

It is this circumstance which causes tidal movements in the oceans and in the firm crust of the earth. On an absolutely firm crust we would, with perfect instruments, be able to observe a deviation in plumbline of  $0''.04$  and a variation in  $g$  of  $0.2$  mgal, gal = unit of acceleration,  $1 \text{ gal} = 10 \text{ mm/sec}^2$ .

#### Not a Rigid Body

However, the earth is not an absolutely rigid body, but elastic to a certain degree. The shape of the globe is thus altered under the influence of the attraction of the moon and the sun. The real gravitational changes at a point deviate because of this from what can be calculated theoretically with the help of the laws of mechanics.

A gravimeter (instrument for measuring  $g$ ) on the earth's surface which, when the moon is in zenith should show  $g$ -minimum, is raised simultaneously with the earth's crust due to the increased attraction and the result is an additional reduction of  $g$ . The situation is further complicated by the volume expansion which occurs at the same time.

#### Pliny the Elder

The first time these phenomena were mentioned in the literature is in "Historia Naturalis" by Pliny the Elder. In it he tells of a well where the water rises and falls in the same manner as in the ocean but at other times.

Calculations show a maximum variation on  $g$  of  $0.16$  mgal due to the moon and  $0.076$  due to the sun or a combination of  $0.24$  mgal, meaning that 1 ton alters its weight by approximately  $0.2$  g due to the attraction of the sun and the moon.

The radial deformation is calculated to have a maximum amplitude of 78 centimeters if the elasticity of the earth is regarded as perfect. If the earth were totally rigid, the deformation would be 0. The earth is neither one nor the other but the actual value is somewhere between the two that were given.

#### Subterranean Water Curve Changes

Fig. 1 shows how the force of gravity and the underground water level in a pit in the rock have varied in phase with one another during 1 month. During new moon and full moon the amplitude is greatest, since at that time the moon and the sun work in the same direction, and on these occasions the curve of the subterranean water shows one minimum and one maximum during a 24-hour period. During the interim periods, when the planets do not act together in the same manner, the underground water curve shows two peaks during 24 hours and the amplitudes are smaller.

Changes in pressure as a result of earthquakes occurring at great distances also affect systems of cracks and underground water conditions in the Swedish bedrock. As an example may be mentioned that 2 hours after a severe

earthquake in Japan the underground water surface in a pit in the rock north of Stockholm varied about 10 centimeters (Fig. 2). Numerous quakes around the world have been "registered" in this manner in the Swedish bedrock.

#### Forsmark Does Not Differ

In the AKA report it was pointed out that Forsmark might be a suitable location for the final storage of radioactive waste. Analyses of the subterranean water made during the period 1965-66 at Hallnaes on the coast of Uppland near Forsmark show that the bedrock in this area does not differ from the general pattern.

In conclusion it might thus be stated, that the Swedish bedrock is not as stable as the study shows and that conclusions have therefore been drawn without sufficient grounds.

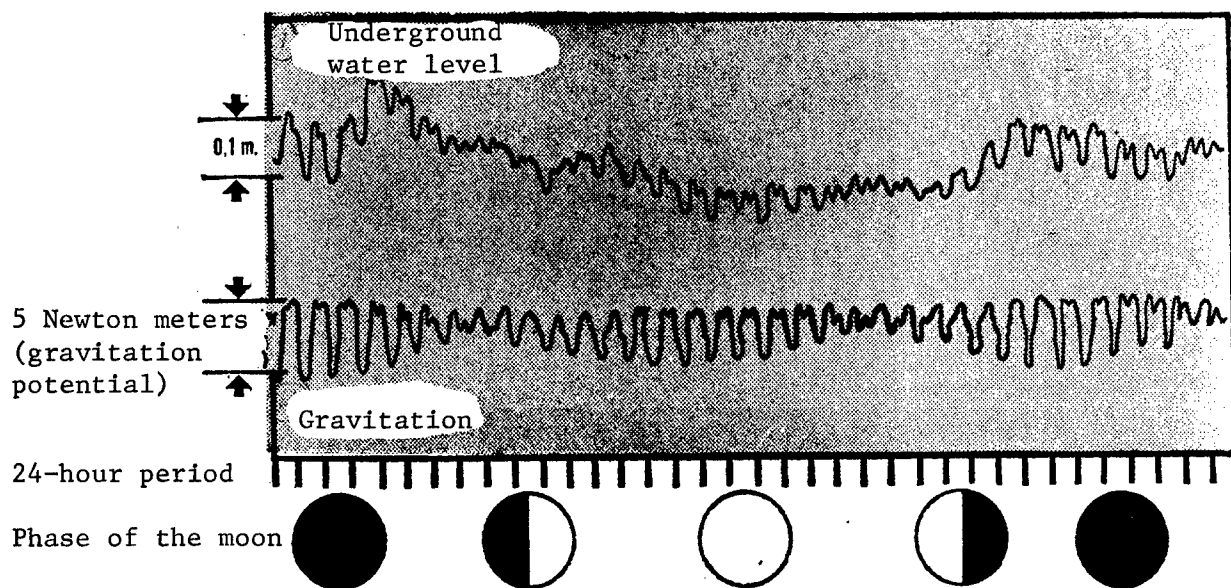


Fig. 1. Changes in the Underground Water Level and Gravitation During 1 Month

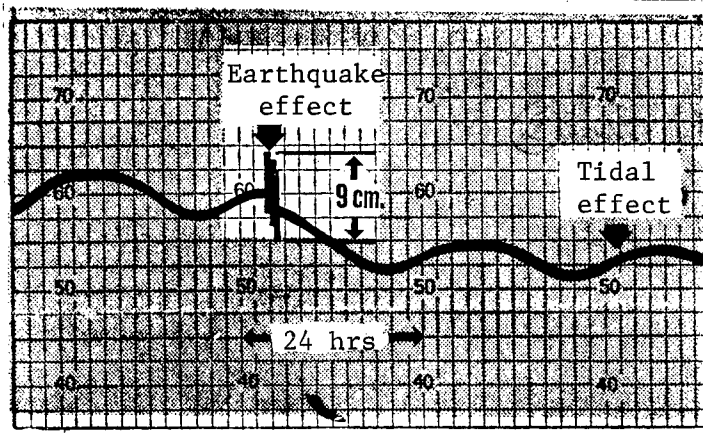


Fig. 2. The underground water level in Sweden was affected by the earthquake in Japan on 16 May 1968 by a movement of 9 centimeters over a few minutes. The numbers refer to arbitrary figures on a water level gauge.

11949

CSO: 5000

## TURKEY

### MUNICIPALITIES UNITE TO PROTECT ENVIRONMENT

Istanbul MILLIYET in Turkish 16 Oct 76 p 2

[Article by Union of Marmara Municipalities Secretary General Avni Ozturk]

[Text] The area under the jurisdiction of the Union of Marmara and Straits Municipalities is Turkey's most developed region in respect to both residential and industrial potential. Villages, cities, and towns are developing rapidly, and problems that accompany this development are becoming unsolvable.

Unplanned, unsupervised, and unhealthy industrialization continues along with the spread of unregulated housing. Gases that harm nature, man's health, and water sources are continuously being spewed into the atmosphere; sewage is continuously being poured into the streams, lakes, straits, and seas. It is evident that the polluted air, seas, and environment have a negative effect on the public's health, water supplies, and tourism. This is the result of ineffective and inappropriate sanctions and outmoded laws.

#### Causes of Pollution

In developed and developing countries, the development and achievement of the types of industrialization and health services that benefit the public are being handled at a number of different levels. Contemporary industrialization means that man's happiness and future take first place, while contemporary health services give priority to public health and preventive medicine. In order to achieve this, the need to regulate in the best possible manner the relationship between man and his environment must be understood. In most nations, ministries to deal with this topic have been established, and the topic is among the most important ones considered when plans are being made.

The industrialization that is taking place in our lifetime has brought with it two critical problems along with its benefits to mankind:

[1.] The pollution of the environment created by industrial wastes, agricultural pesticides and herbicides, sewage, and garbage.

[2.] The huge increase in the number of plastics, agricultural chemicals, and materials used in food production. What is required is that these be regulated and that their effects on nature and man's health be studied.

## Control

Environmental problems, which can be collected under the terms, environmental pollution and environmental health, can only be solved through the combined efforts of a number of organizations and institutions throughout the nation. However, to date, neither the government nor official organizations have placed necessary emphasis on the topics of environmental pollution and environmental health, which are new concerns for Turkey. The National Front government, in particular, has taken the subject so lightly that it has proposed some anachronistic measures that seem to work against the goal of human health.

In a supplementary report to the notice of the Ministry of Health and Social Assistance No 3000/20 dated 18 July 1976, which is an enterprise to prevent gas leakage, which has had a negative effect on humans and which has impaired breathing and caused eyes to water in the Yarimca-Izmit-Golcuk triangle in recent months, there is a preventive proposal which will necessitate that specific power be given to municipal directors, village officials, and martial law administration commanders:

"When incidents of gas leakage occur, municipal directors, village officials, and all health personnel must inform the public of the situation. When the effects of gas leakage, which causes eyes to water, are seen, people must go inside houses and stores and close windows and doors tightly. It must be ensured that people do not come out until the effects disappear." The last proposal reads, "From the standpoint of safety, the higher floors of tall buildings are more beneficial."

There are other current examples of indifference to and lack of responsibility for the health of nature and mankind and of political interests being held more important than any problem.

A while ago, Ankara Municipal Director Dalokay spoke of an intestinal infection that threatened the health of the people of the capital city. Provincial and ministerial officials came out against this report and denied its veracity. Today, they have ceased defending the view that they opposed and refuted a short time ago, because the possibility of political benefits can be seen. However, the incident had been used as a valid reason to dismiss the director. Another current example is seen at Aliaga and at IPRAS [Izmir Petroleum Refinery Corporation].

Party militants, who have no relation with workers, are able to try to destroy these billion-lira organizations by having hundreds of specialists, laborers, and engineers released from their jobs because of the possibility that the organizations bring harm to the environment.

Because of the National Front government's negative position and lack of interest, the Union of Marmara Municipalities, which has no monetary capabilities, and all the chambers of professions that serve the public are expending tremendous efforts to perform the duties given them by law.

Even though a great deal has been said to date in Turkey, a concrete solution to environmental problems has not been able to be put into application. An environment suitable for life ceased to exist first in the Golden Horn, in Izmit Bay, and finally in Gemlik Bay. This is the bitter, but inescapable result of the unplanned, uncontrolled, and unhealthy industrialization whose goal is huge profits. In the light of this truth, the Union of Marmara Municipalities has reached a wide-ranging agreement with the TMMOB [Turkish Union of Chambers of Architects and Engineers] Chamber of Chemical Engineers in order to use the force of legal sanctions so as to implement rapid solutions to environmental problems.

#### What Will Be Done?

The job of supervision of and of obtaining ecological documents from every type of industrial organization and business that has been, is being, and will be established within the jurisdiction of municipalities has been given to municipalities in their governing statutes and in Labor Law No 1475, Water Products Law No 1380, and Municipality Law No 1580. At the written request of the union's official bodies, this function will be carried out by the TMMOB Chamber of Chemical Engineers within the framework of Chambers Law No 7303. The major benefits that will be ensured by the agreement that was reached are:

1. Continuous supervision of industrial organizations will be ensured. Pollution of the environment will be prevented at the source.
2. The creation of ecological problems will be prevented in new industrial regions.
3. A large staff of experts on environmental problems will be trained.
4. The establishment of regional standards in order to prevent environmental problems will be ensured.
5. By studying the environmental problems of developed countries, it will be possible to use them as examples that will prevent Turkey from being exploited or becoming dependent on other nations.

#### If There Are No Obstacles

Within the shortest time possible, an "Environmental Problems and Environmental Health Regulations Document" that will seek to clarify and facilitate

practical implementation of a report that will be put out by the Chamber of Chemical Engineers and a document that will be presented by the Union of Marmara Municipalities will be prepared and will be put into effect after being approved by the union's general council.

If the effectiveness of this undertaking of the Union of Marmara Municipalities, which was established democratically and because of grass-roots' demand, is not impaired by groups that wish to profit from the situation, the day that this type of endeavor will be made throughout all of Turkey will not be far away.

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TURKEY

MOST INDUSTRIAL POLLUTERS ARE LOCATED IN ISTANBUL

Istanbul MILLIYET in Turkish 14 Oct 76 p 9

[Article by Mukaddes Bayraktar: "Forty-Three Percent of Factories Pollute Istanbul's Environment"]

[Text] An official of the Ministry of Industry and Technology disclosed that 43 percent of the industrial facilities which pollute the environment are located in Istanbul. Kemal Gulec, speaking in Istanbul at the Environmental Problems Seminar sponsored by the Scientific Affairs Division of NATO, explained that the polluters were identified by surveys conducted by the ministry.

Reportedly, 2,200 establishments took part in the ministry's survey. The results of the survey showed the following:

\*Among the 2,200 large establishments, 16.6 percent directly contribute to the pollution and destruction of the environment. Among the polluters, 37.97 percent are able to rectify the pollution problems they create, and 46.44 percent have some means of repairing the damage.

\*Only 6.3 percent of the 2,200 industrial facilities are able to solve all the environmental problems they cause.

Which Industries?

\*There are more environmental pollution problems in the manufacturing industry than in any other industrial branch. Some 95 percent of the plants in the manufacturing sector are polluters. Next to the manufacturing sector is the intermediate goods branch where 60.6 percent of the facilities are polluters. It is followed by the food sector with 17 percent, the mineral sector with 4 percent, and the energy sector with 2 percent.

\*A large number--43.14 percent--of the plants which are environmental polluters, are in Istanbul, 6.22 percent in Kocaeli, and 5.20 percent in Izmir and Bursa.

\*Waste material discharged by the polluters can be broken down, in terms of form, as follows: 42.62 percent liquid, 31.96 percent solid, and 25.42 percent gas.

#### Requirement For Incentive Aid

Kemal Gulec of the Ministry of Industry and Technology said that the scientific research to prevent environmental pollution was conducted by the Environmental Problems Coordination Committee of the ministry. He informed the seminar that any industrial facility which applies to the ministry for incentive[assistance] is required to comply with the rule of not polluting the environment as a precondition to obtain government assistance. Mr Gulec said that the ministry discouraged the founding of new facilities in areas with serious pollution problems and stressed the location of new plants elsewhere.

7244

CSO: 5000

TURKEY

# ANTIPOLLUTION LAW INCREASES SEA PRODUCTS YIELD

Istanbul AKSAM in Turkish 21 Oct 76 p 5

[Article: "Ozturk Says, Sea Products Yield Increased Because of Measures"]

[Text] It was announced that preventive measures enforced by the General Directorate of Sea Products, which is under the Ministry of Food, Agriculture, and Animal Husbandry, have resulted in an appreciable increase in the country's harvest of sea products in the past 3 years. Last year, the yield was 260,000 tons, but it is expected to reach 300,000 tons this year.

Adnan Ozturk, director of the Sea Products General Directorate, was interviewed by the Anatolian News Agency, and in response to a question on the enforcement of preventive measures prescribed by the Sea Products Law, Mr Ozturk disclosed that a number of industrial establishments were closed because of their continuing pollution-causing activities, and legal action was taken against several factories for refusal to install antipollution devices.

According to Mr Ozturk, antipollution measures, which went into effect after the enactment of the Sea Products Law 3 years ago, have been strikingly effective against water pollution. He added that the provisions of the new law which outlaw certain fishing methods are strictly enforced. He said:

"Measures are strictly and conscientiously enforced. Seven industrial establishments, which continued to pollute our seas and inland bodies of water by discharging industrial waste into those waters, and failed to build antipollution facilities, have been closed down, and legal action has been taken against several factories on similar grounds. Meanwhile, speedboats have been purchased to keep an eye on outlawed fishing activities. These boats are manufactured in Izmir and can travel at speeds up to 35 miles per hour."

7244

CSO: 5000

LOWER SAXONY SITES FOR RADIOACTIVE WASTE AROUSE PROTESTS

Hamburg DER SPIEGEL in German 8 Nov 76 pp 102-113

[Article: "We Don't Want That Crap Here Either"]

[Text] The "dirtiest business" of the atomic age is to be transacted in Northern Germany. A central atomic waste disposal facility is being set up in Lower Saxony--the specific location has not yet been picked--in other words, a nuclear cemetery which will have to be watched for centuries to come. Citizens protest, Lower Saxony boss Albrecht demands information from Bonn on the risks involved--and three federal ministers are scheduled to come to Hanover for discussions this week.

On a Friday morning last summer, a couple of technicians, carrying all kinds of measurement instruments, accompanied by the local constable from the velvet town, came to Lichten Moor at Nienburg on the Weser. They were supposed to do some exploratory drilling on government-owned land to find out whether the site might be suitable for an atomic waste disposal facility.

A surprising number of villagers just so happened to be out taking a walk on that morning--so many, in the end, that the whole thing turned into a demonstration which kept the technicians away from their work in spite of their police escort.

Since then, opponents of the disposal facility have been camping on the land of farmer Kraft in tents and in old, broken-down buses which in the meantime have been winterized with straw inside and out in preparation for a long winter. A dozen of these people and on weekends even more are always ready to sound the alarm if the atomic age should once again show its face in Lichten Moor. Even the Hanoverian city utilities had to withdraw their people at the end of September even though those men were only supposed to drill for water--because anybody could get in with them.

The mistrust regarding the nuclear muck is entirely too deep-seated. Said one farmer: "The crap which they don't want to dump anyplace else we don't want here in Lichten Moor either."

But nobody else, anywhere else, wants what, according to the plans of the Federal Ministry of the Interior for Research and Technology, is to be put up somewhere in Lower Saxony:

a reprocessing plant which would break down the fuel rods, which were used up in the nuclear powerplants, into useful fission material and radioactive waste,

a fuel element factory which would again turn the recovered nuclear fuel, that is, uranium and plutonium, into fuel rods,

a deposit for atomic wastes in the salt layers deep underground.

What they are looking for, for the time being, is an extensive salt body [dome] in which radioactive wastes could be stored in a manner safe for man and the environment. There are primarily three areas in Lower Saxony which seem suitable and where underground salt deposits have existed unchanged through millions of years--areas which moreover are only thinly settled: in addition to Lichten Moor, Wipplingen, in the Emsland, and Unterlues on Lueneburg Heath.

Out in the middle of nowhere, they want to deposit below ground something that "is one of the biggest problems" which--according to the Bonn Technology Ministry--"result from the use of nuclear energy." The experts clearly realized a long time ago: the removal of atomic waste is THE problem of this generation and all future generations. "The hazard continues in spite of continuing decay sometimes over tens of thousands of years."

A 1,200-megawatt reactor, such as it is operated at Biblis, annually generates 30 tons of burned-out fuel elements; they contain about 300 different fission products, most of which can neither be used nor can they be rendered technically harmless--so, they are supposed to be lowered into the ground.

A reprocessing plant likewise is anything but a trifle when it comes to environmental hazards. Here, according to Munich scientist Frederic Vester, it is necessary to take care of "the dirtiest business in all reactor technology"--and the more the word gets around among the people who live nearby, the more are they afraid.

To dispel those fears, the protagonists of the atom sometimes get some rather odd ideas. In Wipplingen, in the Emsland, for example, in the rural district of Aschendorf-Huemmling, representatives of the Federal Government-owned German Shaft Construction and Deep-Drilling Company got the idea of trying to hoodwink Mrs Helene Frericks, a woman running a farm, and to persuade her to give her permission to start drilling on the Frericks farm. "They only talked about oil," the widow reported later--but the gentlemen were not in the remotest thinking of that; all they were thinking about was salt.

The suspicious Emslanders however were not as dumb as all that. When the drilling teams finally came in, the farmers had dug ditches around the

farmyard, 1.5 meter deep, and the technicians had to depart.

The Emsland resistance movement has a pretty good chance. The adversary is gradually realizing that the NATO firing range in the vicinity might perhaps not be the best place for an atomic waste dump--for psychological reasons alone.

If all of this were as harmless as they say, then the stuff could be taken to Hanover, said Wipplingen's Mayor Hermann Gerdes: "We would prefer to remain an agricultural area."

At the end of October, experts from the Research Ministry once again went to work on the local politicians but the latter remained unyielding. And they are afraid not only of the waste but also of the fact that the entire landscape could change. "We do not want to become a second Castrop-Rauxel," said Gerdes.

One of those who would be affected is the farmer and forester Georg von der Ohe who for quite some time has hardly been concerned with his farm and has almost exclusively been involved in the struggle against the waste dump which he feels would "threaten my existence." The family has been living on Oberohe since the 13th century "and this is where we want to stay."

There are protests also at the third alternate site: at Unterluess in the southern part of Luenenburg Heath between Celle and Uelzen. To be sure, drillings have progressed most there and sometimes "work was done around the clock," according to Adalbert Schlitt, the business manager of KEWA (Nuclear Fuel Reprocessing Company) which is later on supposed to operate the nuclear fuel waste dump for the Federal Government and which for the time being is investigating the sites. But not much more is left to be investigated in Unterluess either. The first drillhole of course was completed but work on the second one had to be suspended due to public pressure.

The Uelzen City Theater was jammed--a rare event--when the citizens were summoned to attend the first briefing meeting. "In the middle of the Southern Heath Nature Park, the population is to be deprived of an area of 12 square kilometers," complained an initiative by "Citizens Against Atomic Waste Processing on the Heath" in leaflets, "but the dangerous thing is that the Heath will be radioactively contaminated."

Official sources sometimes deny and on occasion slightly simplify the fact that this is indeed true. But fear cannot be met with soothing remarks alone. Thousands came to participate in demonstrations at the drilling site when, early in autumn, the citizens initiative urged everyone to come to the Southern Heath under the motto: "We are going mushroom picking."

A milkman from the missionary village of Hermannsburg had parked his delivery truck next to the cows with a sign reading: "From German farms fresh to your table--but how much longer?"

The farmers are suspicious whenever there is talk of a confidential document from the Lower Saxonian Economy Ministry at protest demonstrations whose authenticity the agency of course denies. Accordingly, an expert is supposed to have said: "at the location of this plant, the farmers will have to switch from dairy farming to other production activities."

"The question," Economy Minister Walther Leisler Kiep tried to sooth everyone initially, "as to whether the operation of a nuclear powerplant or a waste disposal facility would create greater hazards simply does not come up." But those who insist on asking are dismissed only too quickly and branded as being unconstitutional. "Some of the opponents," according to KEWA Business Manager Schlitt, are carrying out "a certain political assignment" which is not directed against the plant "but against the democratic system of West Germany."

The facility--with an investment volume of DM5 or perhaps more likely DM6 billion--would provide jobs for almost 4,000 persons and, according to Kiep "is thus of very great significance in terms of structural policy and is liable considerably to upgrade the region in which it is put up." But this might not be exactly good for tourist travel.

CDU [Christian Democratic Union] State Assemblyman Walter Remmers, from the Aschendorf-Huemmling Election District, a colleague of Kiep, compares the possible effects more "with the gold rush in the Wild West"--an upswing for one generation and a ghost town for those who come after.

The absorption capacity of a waste disposal facility probably will hold up 2 or 3 decades and after that it will only have to be watched--possibly into the millenium after the next.

Both opponents and advocates however do not deny that a solution for atomic waste will have to be found very soon. "The unsolved waste disposal question," according to chemistry docent Frank Haenschke, "will become the number one safety problem of West Germany during the eighties."

And Haenschke does not allow himself to be dismissed as a radical troublemaker--the scientist is a SPD [Social Democratic Party of Germany] deputy in Bonn and chairman of the Parliamentary Committee on Radiation Protection and Reactor Safety.

Thus only Lower Saxony comes under consideration as the location for the planned disposal facilities. Suitable salt domes--where the population density is relatively low--can be found only between the Harz [Mountains] and the North Sea for the "outhouse" method--reprocessing on top, storage below, in the interior of the earth.

In the meantime, the used-up fuel rods can still be treated in the small nuclear research center at Karlsruhe--with an annual capacity of 40 tons--and for the most part abroad. But the British and the French for the future demand such high prices that German reactor operators will no longer be willing to pay them. The nine German powerplants must thus find a way to put the nuclear waste somewhere for the time being.

The problem can be solved under current conditions only if the disposal center--regardless of whether it is located in Unterlueess or Wippingen, in Lichten Moor or elsewhere--will actually be available until the middle of the eighties, as planned.

If not, if popular resistance should delay the project or if it should prevent the erection of a reprocessing plant and a waste dump, then, according to the Research Ministry, "a moratorium on the further use of atomic energy" would be unavoidable.

This would not only involve the functional capability of the already operating nuclear powerplants which, for example, in Lower Saxony, today already meet one-fifth of the energy requirement; the operation of another about 40 planned atomic reactors would be threatened and the Federal Government's nuclear energy program would only be an empty shell.

Critics think that this is something that should have been figured out in advance and besides, the program is excessive and, at least as regards the 40 new reactors, would have to be cut back drastically--according to a "Heidelberger Memorandum" which was signed by several hundred scientists.

Cosigner Dieter von Ehrenstein, who is in charge of the Department of Experimental Physics in Bremen, demands "a consistent discontinuation of the further construction of nuclear powerplants," so long as the waste disposal problems have not been cleared up. "We have allowed ourselves," commented SUEDEUTSCHE ZEITUNG recently, "so to speak, to be put into a rocket whose control mechanism is not ready and which has not yet found a landing site."

This is a thought which in the meantime also has begun to worry lower Saxony's Head of Government Ernst Albrecht. In the meantime, says Albrecht, "our own experts told us that a series of points has not yet been cleared up." The Prime Minister wrote to the Chancellor and asked for "full information." Albrecht's suspicion: "The Federal Government obviously had lots of investigations conducted which we are not familiar with."

And he is to learn all about them. Three men from Bonn--the interior, economy, and research ministers--will go to Hanover on Thursday of this week to ask Albrecht to give them his blessings. But Albrecht--remembering Wyhl and Brokdorf--wants to take his time, one way or the other. The decision actually is not a political matter but rather "a kind of scientific examination."

Albrecht explained that he "took a lot of trouble" to explore the problems of atomic energy: "and I know that one must proceed with tremendous care because nobody can take the responsibility for something happening."

"Everybody Wants To Go Into the Salt Mine"

The first radioactive waste has been deposited in the Asse Salt Mine.

Every Tuesday and Friday, a Federal Railroad flatbed truck-trailer is driven from the Hanover-Linden freight station over Lower Saxonian roads for a distance of 80 kilometers to Remlingen near Wolfenbuettel and delivers drums there which, according to the recipient, disappear "forever."

The shipment requires not only "Special License No. 449 for Annex C to the Railroad Traffic Regulations." Where a crane lifts the drums from the flatbed trailer in Remlingen, the concrete floor is moreover marked with red paint and the visitor is asked "not to step over the line because something might happen."

What that might be is called "contamination hazard" and there are signs on the walls that provide a warning against harmful contact with the content of the drums: waste collected at the Karlsruhe Nuclear Research Center, slightly or medium radioactive but at any rate radioactive, strontium 90 or perhaps cesium 137, which every 33 years radiates about half of its energy. This an everyday thing for the scientists: "after 300 years," said Engineer Egon Albrecht in Remlingen, "you can forget that stuff."

Until then of course the atomic waste must be isolated, it must practically be deposited in a "final dump, the last link in the chain," according to Albrecht, "and if we do not have that, then we cannot build any nuclear powerplant." Work has been underway for 9 years on a model of the last link in the chain at Remlingen, in the Asse Salt Mine, as much as 750 meters below ground. Said Albrecht, who is in charge of the operation: "Here we have the only functioning terminal deposit of the entire Western World."

Earlier it had been discussed that one might bury radioactive waste in the deserts, that one might drop it into the oceans or freeze it at the poles or, if possible, one might fire it at the sun with missiles. Ever since Asse has been developed, the word now, according to Albrecht, is: "salt is the big ace in the hole" and where ever waste is produced along with nuclear energy, "everybody follows the salt line and everybody wants to go down into the salt mines," and even Soviet experts have already inspected the mine at Remlingen for this reason. Only the GDR has not yet sent anybody; according to reports, they are digging into the salt east of Helmstedt as part of a State-owned operation.

Salt not only offers the advantage that, thanks to its plasticity, it does not form any cracks or gaps as other rocks and therefore remains tight in containing liquids and gases. Besides, in salt it is easier to clear out empty spaces, so-called mining chambers, of which Asse has a total of 131, most of which are 60 meters long, 40 meters wide, and 15 meters high; according to Albrecht, "you could put a village church there."

Above all, salt formations last longer than the radiation coming from radioactive waste: ever since the Asse salt dome was forced out 110 million years ago, nothing has shaken it or moved it and, according to Albrecht,

who started out as a miner, "there is no reason why anything should change over the next hundred million years."

In five chambers at a depth of 750 meters--where indeed "a very pleasant climate" (Albrecht) prevails at 28 degrees and only 30 percent humidity--the Deep-Storage Institute of the Federal Government's "Society for Radiation and Environmental Research" so far has stacked up 68,000 drums with slightly radioactive waste, in some cases in ten layers, one above the other, and the appearance is so trivial that one would find it difficult to manage a proper shudder.

Down there, Albrecht, once upon a time an active-duty armor officer, drives around in his "Turbosteiger-Diesel," with the searchlights on, over a 3.5-kilometer long serpentine made of salt-concrete up to the 490-meter level where a couple of drums with medium-radioactive waste have just been made to disappear once and for all: through a drillhole, which in the meantime has been closed up again radiation-proof, those drums were lowered by cable to a depth of 21 meters into a mining chamber numbered 8a.

On a monitor one can see via a TV camera how they will rest there in perpetuity, 1,200 drums with a combined radiation intensity of 120,000 Curie; "that is quite enough," said Albrecht, explaining the dangerous nature of the deposit facility which has room for another 8,800 drums. But the needle of the radiation meter in the charge chamber above so far has not moved. The dose in the 60 people, who work in the Asse Mine, has been reduced from the earlier figure of 250 down to less than 40 Milli-Rem per month--"far less," according to Albrecht's calculation, than a female x-ray assistant has to take.

Still: Asse is not the final solution, it is not the terminal depository for everything that is yet to come out of the reactors. First of all, the capacity will not extend far beyond the year 2000 and, besides, the mine does have its weak points: the so-called safety pillar up to the overthrust mountains, instead of the required 150 meters measures only 40 meters; moreover, there is a layer of the salt mineral carnallite extending through the rock salt which of course does shine like pinkish-red marble but which is less stable and also more easily soluble. "Here," said Albrecht, "we have to live with this fact but what we do need is a pure rock salt deposit."

In the opinion of geologists, there is enough of this in the 1,000-meter thick salt packet which is under the North German Depression and which extends under the North Sea all the way to England--the only thing is that the most suitable deposit remains yet to be found, in Emsland, in Lichten Moor, and perhaps on Luenenburg Heath.

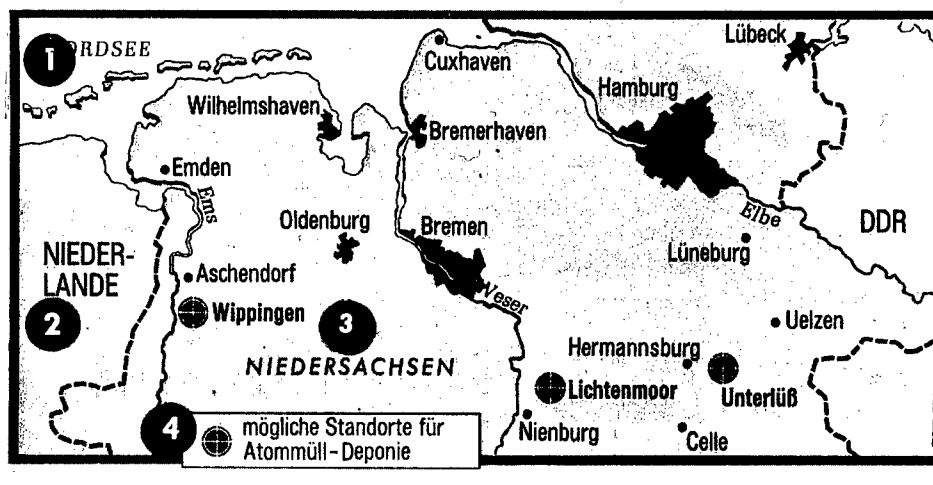
Regardless of where atomic wastes may be stowed in the future--the technology and the method are already being implemented in the Asse Mine and they are partly being simulated. Highly-radioactive waste is soon expected here, "hot stuff," which even in smaller portions radiates up to 500,000 Curie; said Albrecht: "If you stand next to that stuff, you will be burned out inside within a few seconds"; and this material develops

temperatures of 350 degrees on the inside and 200 degrees toward the outside; this is why an experimental temperature field has been set up at a depth of 750 meters.

Electric heaters produce the expected degrees of heat in the salt and the technicians measure not only whether the heat is retained or "disappears forever" but also whether the impetus from the heat is capable of moving the mountain in such a fashion that it will finally collapse. Experimental results so far: the heat is "quickly evacuated into the cool head of the overthrust mountains" and the movements come to "a maximum of 5 millimeters per year," according to Albrecht's diagnosis.

In the meantime, the farmers keep driving their vehicles and their plows over the Asse mine, where atomic death seems to be buried and on Sunday there are many hikers who camp high above the salt on the edge of the woods. "Albrecht of course had traveled from village to village "like a circuit-riding preacher" and staged "a comprehensive public relations program" with "a day of open house" four times a year to invite everybody to come with kit and kaboodle to go down into the mine. Said Albrecht: "We take anybody, except people with heart ailments."

In the plant management building of course St. Barbara--carved in wood of course--has her hands folded: "So far we have not had a single accident here," reports Albrecht but, just to be on the safe side, he knocks on his hard hat a couple of times.



- Key: 1. North Sea  
2. The Netherlands  
3. Lower Saxony  
4. Possible sites for atomic waste disposal facilities

5058  
CSO: 5000

- END -